

Drama of the Atomic Bomb Found Climax in July 16 Test

Following is the first of a number of articles by a staff member of THE NEW YORK TIMES who was detached for service with the War Department at its request to explain the atomic bomb to the lay public. He witnessed the first test of the bomb in New Mexico and, on a flight to Nagasaki, its actual use.

By WILLIAM L. LAURENCE

The Atomic Age began at exactly 5:30 Mountain War Time on the morning of July 16, 1945, on a stretch of semi-desert land about fifty airline miles from Alamogordo, N. M., just a few minutes before the dawn of a new day on this earth.

At that great moment in history, ranking with the moment in the long ago when man first put fire to work for him and started on his march to civilization, the vast energy locked within the hearts of the atoms of matter was released for the first time in a burst of flame such as had never before been seen on this planet, illuminating earth and sky for a brief span that seemed eternal with the light of many super-suns.

The elemental flame, first fire ever made on earth that did not have its origin in the sun, came from the explosion of the first atomic bomb. It was a full-dress rehearsal preparatory to use of the bomb over Hiroshima and Nagasaki—and other Japanese military targets had Japan refused to accept the Potsdam Declaration for her surrender.

The rehearsal marked the climax in the penultimate act of one of the greatest dramas in our history and the history of civilized man—a drama in which our scientists, with the Army Corps of Engineers as director, were working against

Continued on Page 16. Column 2

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Continued From Page 1

time to create an atomic bomb ahead of our German enemy.

The collapse of Germany marked the end of the first act of this drama. The successful completion of our task, in the greatest challenge by man against nature so far, brought down the curtain on the second act.

The grand finale came three weeks afterward over the skies of Japan with a swift descent of the curtain on the greatest war in history.

The atomic flash in New Mexico came as a great affirmation to the prodigious labors of our scientists during the past four years, in which they managed to "know the unknowable and unscrew the inscrutable."

It came as the affirmative answer to the until then unanswered question: "Will it work?"

With the flash came a delayed roll of mighty thunder, heard, just as the flash was seen, for hundreds of miles. The roar echoed and reverberated from the distant hills and the Sierra Oscura Range near by, sounding as though it came from some supramundane source as well as from the bowels of the earth.

The hills said "yes" and the mountains chimed in "yes." It was as if the earth had spoken and the suddenly iridescent clouds and sky had joined in one mighty affirmative answer. Atomic energy—yes.

It was like the grand finale of a mighty symphony of the elements, fascinating and terrifying, uplifting and crushing, ominous, devastating, full of great promise and great forebodings.

I watched the birth of the Era of Atomic Power from the slope of a hill in the desert land of New Mexico, on the northwestern corner of the Alamogordo Air Base, about 125 miles southwest of Albuquerque. The hill, named Compania Hill for the occasion, was twenty miles to the northwest of Zero, the code name given to the spot chosen for lighting the first atomic fire on this planet. The area embracing Zero and Compania Hill, twenty-four miles long and eighteen miles wide, had the code name Trinity.

Caravan of Scientists by Night

I joined a caravan of three buses, three automobiles and a truck carrying radio equipment at 11 P. M. Sunday, July 15, at Albuquerque. There were about ninety of us in that strange caravan, traveling silently and in utmost secrecy through the night on probably as unusual an adventure as any in our day.

With the exception of your correspondent, the caravan consisted of scientists from the highly secret atomic bomb research and development center in the mesas and canyons of New Mexico, twenty-five miles northwest of Santa Fe, where we solved the secret of translating the fabulous energy of the atom into the mightiest weapon ever made by man. It was from there that the caravan set out at 5:30 that Sunday afternoon for its destination, 212 miles to the south.

These were the "mesa-men" on the march, dwellers in the "caves" in the interior of atoms, pioneer explorers of vast new continents in hitherto forbidden realms of the cosmos, builders of the civilization of tomorrow.

Here on trails hallowed by pioneers of other days, who opened new frontiers and did not rest until they conquered a continent, "covered wagons" were rolling again through the night on their way to open still newer frontiers of a continent that has no limits in space.

The caravan wound its way slowly over the tortuous roads overlooking the precipitous canyons of northern New Mexico, passing through Espagnola, Santa Fe and Bernadillo, arriving at Albuquerque at about 10 P. M. Here it was joined by Sir James Chadwick, who won the Nobel Prize and knighthood for his discovery of the neutron, the key that unlocks the atom; Professor Ernest O. Lawrence of the University of California, master atom-smasher, who won the Nobel Prize for his discovery of the cyclotron; Professor Edwin H. McMillan, also of the University of California, one of the discoverers of plutonium, the new atomic energy element, and several others from the atomic bomb center, who, with your correspondent, had arrived during the afternoon.

The night was dark with black clouds and not a star could be seen. Occasionally a bolt of lightning would rend the sky and reveal for an instant the flat semi-desert landscape, rich with historic lore of past adventure. We, too, were headed for adventure, Argonauts on the way to a Golden Fleece richer by far than Jason

ever found. We were on the road to the fabled golden Seven Cities of Cibola, sought in vain by Coronado on trails not too far away from the area we were traversing.

We rolled along on U. S. Highway 85, running between Albuquerque and El Paso, through sleeping ancient Spanish-American towns, their windows dark, their streets deserted—towns with music in their names, Las Lunas, Belen, Bernardo, Alamillo, Socorro, San Antonio.

At San Antonio we turned east and crossed "the bridge on the Rio Grande with the detour in the middle of it." We traveled ten and one-half miles eastward on U. S. Highway 380, where we turned south on a specially built dirt road, running for twenty-five miles to the Base Camp at Trinity.

The end of our trail was reached after we had covered about five and one-fifth miles on the dirt road. Here we saw the first signs of life since we had left Albuquerque about three hours earlier, a line of silent men dressed in helmets. A little further ahead a detachment of military police examined our special credentials.

We descended and looked about us. The night was still pitch black save for an occasional flash of lightning in the eastern sky, outlining for a brief instant the range of Sierra Oscura directly ahead of us. We were in the middle of the New Mexico desert, miles away from nowhere, not a sign of life, not even a blinking light on the distant horizon. This was to be our caravansary until the zero hour.

From a distance to the southeast the beam of a searchlight probed the clouds. This gave us our first sense of orientation. The bombing test site, Zero, was a little to the left of the searchlight beam, twenty miles away. With the darkness and the waiting in the chill of the desert the tension became almost unendurable.

Directions for Observers' Safety

We gathered around in a circle to listen to directions on what we were to do at the time of the "shot," directions read aloud by the light of a flashlight:

At a short signal of the siren at minus five minutes to zero "all personnel whose duties did not specifically require otherwise" were to prepare "a suitable place to lie down on."

At a long signal of the siren at minus two minutes to zero "all personnel whose duties did not specifically require otherwise" were to "lie prone on the ground immediately, the face and eyes directed toward the ground and with the head away from Zero."

"Do not watch for the flash directly," the directions read, "but turn over after it has occurred and watch the cloud. Stay on the ground until the blast wave has passed (two minutes)."

"At two short blasts of the siren, indicating the passing of all hazard from light and blast, all personnel will prepare to leave as soon as possible."

"The hazard from blast is reduced by lying down on the ground in such a manner that flying rocks, glass and other objects do not intervene between the source of blast and the individual. Open all car windows."

"The hazard from light injury to eyes is reduced by shielding the closed eyes with the banded arms and lying face down on the ground. If the first flash is viewed a 'blind spot' may prevent your seeing the rest of the show."

"The hazard from ultraviolet light injuries to the skin is best overcome by wearing long trousers and shirts with long sleeves."

David Dow, assistant to the scientific director of the Atomic Bomb Development Center, handed each of us a flat piece of colored glass used by arc welders to shield their eyes. Dr. Edward Teller of George Washington University cautioned us against sunburn.

Someone produced sunburn lotion and passed it around.

It looked eerie seeing a number of our highest ranking scientists seriously rubbing sunburn lotion on their faces and hands in the pitch blackness of the night, twenty miles away from the expected flash. These were the men who, more than anybody, knew the potentialities of atomic energy on the loose. It gave one an inkling of their confidence in their handiwork.

The bomb was set on a structural steel tower 100 feet high. Nine miles away to the southwest was the base camp. This was G. H. Q. for the scientific high command, of which Professor Kenneth T. Bainbridge of Harvard University was field commander.

Here were erected barracks to serve as living quarters for the scientists, a mess hall, a commissary, a Post Exchange and other buildings. Here the vanguard of the atomists, headed by Prof. J. R. Oppenheimer of the University of California, scientific director of the atomic bomb project, lived like soldiers at the front, supervising the enormously complicated details involved in the epoch-making tests.

Here early that Sunday afternoon gathered Maj. Gen. Leslie R. Groves, Commander in Chief of the Atomic Bomb Project; Brig. Gen. T. F. Farrell, hero of World War I, General Groves' deputy; Prof. Enrico Fermi, Nobel Prize winner and one of the leaders in the project; President James Bryant Conant of Harvard; Dr. Vannevar Bush, Director of the Office of Scientific Research and Development; Dean Richard C. Tolman of the California Institute of Technology, Prof. R. F. Bacher of Cornell, Col. Stafford L. Warren, University of Rochester (N. Y.) radiologist, and a host of other leaders in the atomic bomb program.

At the Base Camp was a dry, abandoned reservoir, about 500 feet square, surrounded by a mound of earth about eight feet high. Within this mound bulldozers dug a series of slit trenches, each about three feet deep, seven feet wide and about twenty-five feet long.

At a command over the radio at zero minus one minute all observers at Base Camp, about 150 of the "Who's Who" in science and the armed forces, lay down "prone on the ground" in their pre-assigned trenches, "face and eyes directed toward the ground and with the head away from Zero."

Three other posts had been established, south, north and west of Zero, each at a distance of 10,000 yards (5.7 miles). These were known, respectively, as South-10,000, North-10,000 and West-10,000, or S-10, N-10 and W-10.

Here the shelters were much more elaborate, wooden structures, their walls reinforced by cement, buried under a massive layer of earth.

S-10 was the control center. Here Professor Oppenheimer, as scientific commander in chief, and his field commander, Professor Bainbridge, issued orders and syn-

chronized the activities of the other sites.

Here the signal was given and a complex of mechanisms was set in motion that resulted in the greatest burst of energy ever released by man on earth up till that time.

No switch was pulled, no button pressed, to light this first cosmic fire on this planet.

At forty-five seconds to zero, set for 5:30 o'clock, young Dr. Joseph L. McKibben of the University of California, at a signal from Professor Bainbridge, activated a master robot that set off a series of other robots. Moving "electronic fingers" writ and moved on, until at last strategically spaced electrons moved to the proper place at the proper split second.

The forty-five seconds passed and the moment was zero.

At our observation post on Compania Hill the atmosphere had grown tenser as the zero hour approached. We had spent the first part of our stay partaking of an early morning picnic breakfast that we had taken along with us. It had grown cold in the desert and many of us, lightly clad, shivered. Occasionally a drizzle came down and the intermittent flashes of lightning made us turn apprehensive glances toward Zero.

We had had some disturbing reports that the test might be called off because of the weather. The radio we had brought along for communication with Base Camp kept going out of order, and when we had finally repaired it some blatant band would drown out the news we wanted to hear.

We knew there were two specially equipped B-29 Superfortresses high overhead to make observations and recordings in the upper atmosphere, but we could neither see nor hear them. We kept gazing through the blackness.

Suddenly, at 5:29:50, as we stood huddled around our radio, we heard a voice ringing through the darkness, sounding as though it had come from above the clouds:

"Zero minus ten seconds!"

A green flare flashed out through the clouds, descended slowly, opened, grew dim and vanished into the darkness.

The voice from the clouds boomed out again:

"Zero minus three seconds!"

Another green flare came down. Silence reigned over the desert. We kept moving in small groups in the direction of Zero. From the east came the first faint signs of dawn.

And just at that instant there rose from the bowels of the earth a light not of this world, the light of many suns in one.

It was a sunrise such as the world had never seen, a great green super-sun climbing in a fraction of a second to a height of more than 8,000 feet, rising ever higher until it touched the clouds, lighting up earth and sky all around with a dazzling luminosity.

Up it went, a great ball of fire about a mile in diameter, changing colors as it kept shooting upward, from deep purple to orange, expanding, growing bigger, rising as it was expanding, an elemental force freed from its bonds after being chained for billions of years.

For a fleeting instant the color

was unearthly green, such as one sees only in the corona of the sun during a total eclipse.

It was as though the earth had opened and the skies had split. One felt as though he had been privileged to witness the Birth of the World—to be present at the moment of Creation when the Lord said: Let There be Light.

On that moment hung eternity. Time stood still. Space contracted into a pinpoint.

To another observer, Prof. George B. Kistiakowsky of Harvard, the spectacle was "the nearest thing to Doomsday that one could possibly imagine."

"I am sure," he said, "that at the end of the world—in the last milli-second of the earth's existence—the last man will see what we saw!"

A great cloud rose from the ground and followed the trail of the Great Sun.

At first it was a giant column that soon took the shape of a supramundane mushroom. For a fleeting instant it took the form of the Statue of Liberty magnified many times.

Up it went, higher, higher, a giant mountain born in a few seconds instead of millions of years, quivering convulsively.

It touched the multi-colored clouds, pushed its summit through them, kept rising until it reached a height of 41,000 feet, 12,000 feet higher than the earth's highest mountain.

All through this very short but extremely long time-interval not a sound was heard. I could see the silhouettes of human forms motionless in little groups, like desert plants in the dark.

The new-born mountain in the distance, a giant among pigmies against the background of the Sierra Oscura range, stood leaning at an angle against the clouds, a vibrant volcano spouting fire to the sky.

Roar Reverberations Over Desert

Then out of the great silence came a mighty thunder. For a brief interval the phenomena we had seen as light repeated themselves in terms of sound.

It was the blast from thousands of blockbusters going off simultaneously at one spot.

The thunder reverberated all through the desert, bounced back and forth from the Sierra Oscuras, echo upon echo. The ground trembled under our feet as in an earthquake.

A wave of hot wind was felt by many of us just before the blast and warned us of its coming.

The Big Boom came about 100 seconds after the Great Flash—the first cry of a new-born world. It brought the silent, motionless silhouettes to life, gave them a voice.

A loud cry filled the air. The little groups that hitherto had stood rooted to the earth like desert plants broke into a dance, the rhythm of primitive man dancing at one of his fire festivals at the coming of spring.

They clapped their hands as they leaped from the ground—earth-bound man symbolizing a new birth in freedom—the birth of a new force that for the first time gives man means to free himself

from the gravitational pull of the earth that holds him down.

The dance of the primitive man lasted but a few seconds, during which an evolutionary period of about 10,000 years had been telescoped. Primitive man was metamorphosed into modern man—shaking hands, slapping each other on the back, laughing like happy children.

The sun was just rising above the horizon as our caravan started on its way back to Albuquerque and Los Alamos. It rose to see a new thing under the sun, a new era in the life of man.

We looked at it through our dark lenses to compare it with what we had seen.

"The sun can't hold a candle to it!" one of us remarked.

Additional articles by Mr. Lawrence will appear in early issues.